Psychedelic Interventions for Neuropsychological Conditions

A Call for Further Study by Brian C. Peacock, M.A., Psy.D. Candidate

ADHD & Executive Dysfunction

Ritual ayahuasca use appears to improve some domains of executive functioning (Peacock, 2022). In a finding approaching significance (p=.057; N=80), ADHD prevalence was lower in ayahuasca-using adolescents (2.5%) compared to controls (17.5%) (Da Silveira et al., 2005).

Long-term ketamine treatment for depression and other conditions can weaken cognitive functioning and therefore may worsen ADHD and executive dysfunction (Peacock, 2022, p. 341).

Autism Spectrum Disorder (ASD)

MDMA-assisted psychotherapy was found to be very effective in treating social anxiety in adults with ASD (Danforth et al., 2018). At 6-month follow-up, the treatment effect size was 1.1.

LSD-assisted therapy was used in the 1950s through 1970s to treat ASD in children. Reviewing these studies, Rhead (1977) concluded that these treatments are safe and could replace other drugs used for managing behavior in children with ASD.

A major proponent of LSD therapy for ASD was Lauretta Bender who developed the Bender-Gestalt test. She saw substantial improvements in the perceptual organization of autistic children with daily 100 µg LSD (Bender, 1962).

While caution is warranted in exploring any psychedelic treatment with children, early studies demonstrate the safety and potential efficacy of LSD therapy for children with ASD (Peacock, 2022, p. 424).

Acquired Brain Injuries

DMT infusion for 24 hours following removal of medial cerebral artery occlusion was found to prevent ischemia-reperfusion injury in rats, resulting in 45% reduced lesion volume (Frecska, 2019).

In mice, MDMA treatment before mild traumatic brain injury (mTBI) resulted in fewer cognitive deficits due to MDMA normalizing tyrosine hydroxylase and dopamine levels (Edut et al., 2010, 2014).

Recent MDMA use is associated with severe hyponatremia following mTBI resulting in seizure or deterioration of consciousness (Rukskul, 2005).

Ketamine does not increase ICP in patients with TBI and may instead reduce it (Zeiler et al., 2014). This is contrary to medical dogma up until the mid-2000s (Himmelseher & Durieux, 2005).

Ketamine is neuroprotective in stroke, neurotrauma, subarachnoid hemorrhage, and status epilepticus (Bell, 2017).

Ketamine prevents excitotoxicity through NMDA antagonism and reduces neuroinflammation. Ketamine also reduces cell death and apoptosis by upregulating B-cell lymphoma 2 expression (Bell, 2017).

Finally, ketamine exhibits antiplatelet effects, preventing microthrombosis following TBI and subarachnoid hemorrhage (Bell, 2017).

Age-Related Cognitive Decline

Psychedelics may help prevent or ameliorate age-related cognitive decline for several reasons (Aday et al., 2020; Peacock, 2022, p. 503):

- Ayahuasca can improve executive functioning (though it may negatively impact learning).
- LSD, psilocybin, ayahuasca, and MDMA robustly increase Openness, a trait that tends to decline with age.
- Psychedelics can enhance creativity, a process that can decline with age.
- Aday supposes that the neuroplasticity induced by LSD, DMT, and ketamine could help aging brains. However, over-plasticity in aging brains can cause cortical instability that results in rapid decay of changes (Cisneros-Franco et al., 2018).

Psilocybin microdosing can increase finger tapping speed (p=.03; d=0.34), which is important given that decline in finger tapping speed is a sign of early-stage dementia (Rootman et al., 2022).

Symbol Key:

↑	Statistically significant increase
↓	Statistically significant decrease
∅	No significant change
∅↑	No significant change, but a directional trend
[2]	Number of references that demonstrate a finding. If not shown, only one study is referenced.
-	No research found

Effect Size:

	Small or Tiny effect size [no asterisk] ($d \leq 0.2$)
*	Moderate effect size (d = 0.21–0.5)
**	Large effect size ($d > 0.5$)
***	Very Large effect size ($d > 1.0$)

The Long-Term Neuropsychological Impacts of Psychedelics

Neuropsychological Domain	Mescaline Tx	LSD Tx	Psilocybin Tx	Ayahuasca Tx	Ayahuasca Ritual	MDMA Tx	MDMA Chronic	Ketamine Tx	Ketamine Chronic
Overall Neuropsychological Functioning									
RBANS Total Score	-	-	-	-	-	∅	-	-	-
Intellectual Functioning									
Fluid/General Intelligence	∅	-	-	-	-	-	∅	-	-
Verbal	-	-	-	-	∅	-	↓*[9]	-	-
Visuospatial	∅	-	-	-	∅	-	∅↓	-	-
Processing speed	∅	-	-	-	∅[3]	-	↓*[16] / ∅	↓***	↓*** / ∅↓
Verbal Working Memory	∅	-	-	-	↑* / ∅	-	∅↓*	↓**	
Visual Working Memory	-	-	∅	-	-	-	↓*	-	↓**[2]
Attention									
Overall Attention	-	-	-	-	-	-	↓*[11]	-	-
Sustained Attention	∅	-	∅	-	∅[2]	-	-	-	-
Focused Attention	-	-	-	-	∅	∅	∅	∅[2] / ↓**	-
Visual Search	-	-	-	-	-	-	-	-	↓**
Self-Rated Attention/ Concentration	-	-	-	-	↓*	-	↓***[2]	-	-
Memory and Learning									
General	-	-	-	-	-	-	↓**[11,21] / ↓SR / ∅SR	-	-
Verbal									
Encoding	-	-	∅	-	∅[2]	-	-	-	-
Learning & Recall	-	-	-	-	↓**[2] / ∅	-	↓**[22] / ∅	-	↓[2] / ∅[2] / ∅↓*
Delayed Recall	-	-	-	-	∅[3]	-	↓***[19] / ∅↓**	-	↓*** / ↓ / ∅↓*[2] / ∅
Visual									
Encoding	-	-	-	-	∅	-	∅↓*	-	-
Immediate recall	∅	-	-	∅[2]	-	-	↓*[12] / ↓[14] / ↓***	-	↓*
Delayed recall	∅	-	-	∅	-	∅	↓*[19] / ↓***	-	-
Source memory	-	-	-	-	-	-	↓**	-	-
Prospective memory	-	-	-	-	-	-	↓[2] / ∅	-	-
Executive Functions									
General	-	-	-	-	↑**	-	↓*[16] / ↓**[11]	-	-
Controlled Verbal Fluency	-	-	-	-	-	-	↓	↓**	↓* / ↓*** / ∅↓* / ∅
Category Fluency	-	-	-	-	-	-	↓ / ∅	-	∅[4] / ↓***
Cognitive Inhibition	∅	-	∅	-	∅[3] / ↑	-	∅[4] / ↓[2]	∅↓**	∅↓*
Cognitive Flexibility	∅	-	↑***	-	∅[2] / ↑**	-	∅ / ↓**	↓***	∅↓*
Planning	-	-	-	-	-	-	∅	-	↓*** / ∅↓**
Visuospatial Organization	∅	-	-	-	∅[2]	-	∅[12]	-	-
Verbal Functioning									
Semantic Priming	-	-	-	-	-	-	-	-	↵b
Convergent Thinking	-	-	-	↑	-	-	-	-	-
Divergent Thinking	-	-	-	∅	-	-	-	-	-
Word Reading Speed	-	-	-	-	↑** / ∅	-	-	-	-
Comprehension Speed	-	-	-	-	-	-	-	-	↓**
Psychomotor Functioning									
Reaction Speed	-	↑	-	-	-	-	↓**[11]	-	-
Motor Coordination/Skill	-	-	-	-	-	-	∅[2]	-	-
Finger Tapping	-	-	↑a	-	-	-	-	-	-

(From Peacock, 2022)

Peacock, B. C. (2022). *Applications of psychedelic-assisted psychotherapy across personalities and psychopathologies: An integrative literature review with meta-analysis* [Doctoral Dissertation, The Wright Institute]. ProQuest Dissertations and Theses Global (In Press).

Other references may be found in Peacock (2022) or may be requested from the author.